

REMARKS

Claims 1-21 are pending in this application. Claims 1-21 are rejected. Claims 1, 12 and 20 have been amended. No new matter has been added. It is respectfully submitted that the pending claims define allowable subject matter.

Claims 1-11 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Mentor (U.S. Patent 5,689,189). Applicants respectfully traverse this rejection.

As an initial matter, Applicants find no Mentor reference cited. However, U.S. Patent 5,689,189 is to Morich et al. Applicants believe this was merely a typographical error on the part of the Office and will proceed to respond to Morich et al., which has the patent number as referenced in the Office Action and was included as part of the Office Action.

Morich et al. describes distributed radio frequency coils for magnetic resonance imaging (MRI) having a local radio frequency coil 32 for receiving magnetic resonance signals emanating from a region of interest (column 4, lines 56-58). As shown in FIG. 4, a cylindrical wiring pattern for the radio frequency coil is provided and includes two coil portions 60 and 62 (column 6, lines 34-37). To assure that the current distribution in the coil portions 60 and 62 match, the two portions are connected in series by an interconnection 78 shown as a generally crisscross arrangement (column 6, lines 60-62).

In another embodiment as shown in FIG. 7, in some applications it is advantageous to limit the sensitivity of the coil along the z or axial direction. When constraints are placed on the design such that the coil sensitivity falls off rapidly at the end of the coil, counter-rotating coil sections 80, 82 are added to the ends of the coil. The counter-rotating sections carry currents in an opposite direction of rotation from coils 64 and 68, each having two coil sections 64₁, 64₂ and 68₁, 68₂, respectively (column 12, lines 9-15).

Claim 1, as amended, recites a coil arrangement for a medical imaging system comprising “a plurality of twisted portions in combination with the plurality of coil elements, and wherein a twisted portion is provided between each adjacent coil element of the plurality of coil elements.” Morich et al. fails to describe or suggest such a coil arrangement.

In contrast to claim 1, as amended, Morich et al. shows crisscross interconnections, but not a plurality of crisscross interconnections with one between each adjacent coil elements of a plurality of coil elements. Specifically, FIG. 4 shows only one such interconnection between coil portions 60 and 62. Further, FIG. 7 only shows the crisscross interconnection between adjacent coil sections 80 and 68₁, and 82 and 68₂. No crisscross interconnection is described or suggested between adjacent coil sections 68₁ and 68₂. Additionally, crisscross interconnections are shown between adjacent coil sections 80 and 64₁, and 82 and 64₂, but no crisscross interconnections are described or suggested between adjacent coil elements 64₁ and 64₂. A coil arrangement having a plurality of twisted portions wherein a twisted portion is provided between each adjacent coil element of the plurality of coil elements is simply not described or suggested.

Claims 2-11 depend from independent claim 1. When the recitations of these claims are considered in combination with the recitations of claim 1, Applicants submit that these dependent claims are likewise patentable over Morich et al. for at least the same reasons set forth above.

Thus, for at least the reasons set forth above, Applicants respectfully request that the 35 U.S.C. § 102(b) rejection of claims 1-11 be withdrawn.

Claims 12-21 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Vaughan (U.S. Patent 4,812,761). Applicants respectfully traverse this rejection.

Vaughan describes magnetic resonance surface coils having two loops 40 and 41 with inner wires 57 and 58 that cross each other. The crossing of the wires is shown roughly in the shape of an "X" in FIG.4, but the inner wires 57 and 58 may be roughly parallel to each other (column 11, lines 51-55). In another embodiment shown in FIG. 10, a surface coil 22 includes a parallel array of four loops. The surface coil 22 has a first loop 48, a second loop 49, a third loop 50, and a fourth loop 51. As shown in FIG. 10, the first, second, third and fourth loops 48, 49, 50 and 51 are connected in phase (column 12, lines 50-55). All of the loops 48, 49, 50 and 51 illustrated in FIG. 10 are preferably coplanar, that is, all substantially lying within the same general plane (column 12, lines 64-66). In a preferred embodiment, a

variable tuning capacitor 52 is provided in order to resonate the four loop array at the desired frequency of operation. The tuning capacitor 52 is electrically connected in parallel with the loops 48, 49, 50 and 51 (column 13, lines 1-5). The embodiment illustrated in FIG. 10 of a four loop array is one example of an equal phase resonant loop array electrically connected in parallel in a coplanar configuration (column 13, lines 18-21).

Claim 12, as amended, recites a coil array for a medical imaging system comprising “a second coil array portion having a multi-lobe saddle train, the multi-lobe saddle train comprising a plurality of twisted portions and wherein a twisted portion is provided between each adjacent lobe of the multi-lobe saddle train.” Vaughan fails to describe or suggest such a coil array.

In contrast to claim 11, as amended, Vaughan shows crisscross interconnections, but not a plurality of crisscross interconnections with one between each adjacent lobe of a multi-lobe saddle train. Specifically, FIG. 4 shows only one such interconnection between loops 40 and 41. Further, FIG. 10 only shows the crisscross interconnection between adjacent loops 48 and 49, and 50 and 51. Vaughan additionally shows a crisscross interconnection between loop pairs defined by loops 48 and 49, and 50 and 51. However, Vaughan fails to describe or suggest twisted portions between each adjacent lobe of a multi-lobe saddle train. Specifically, no crisscross interconnection is shown between either loops 48 and 50, 49 and 51, 48 and 51 and 49 and 50. A coil array having twisted portions between each adjacent lobe of a multi-lobe saddle train is simply not described or suggested.

Claims 13-19 depend from independent claim 12. When the recitations of these claims are considered in combination with the recitations of claim 12, Applicants submit that these dependent claims are likewise patentable over Vaughan for at least the same reasons set forth above.

Claim 20, as amended, recites a method for providing coil arrays for a medical imaging system comprising “providing a twisted portion between each adjacent coil element of the plurality of coil elements.” Vaughan fails to describe or suggest such a method.

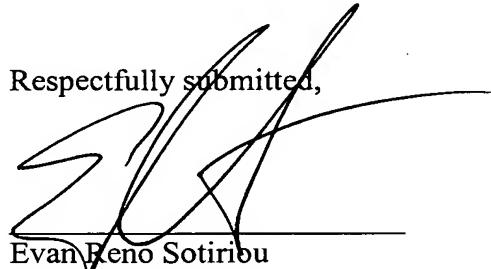
In contrast to claim 20, as amended, and as described in more detail with respect to claim 12 above, a twisted portion is not shown, nor described or suggested, between each adjacent coil element of the plurality of coil elements in Vaughan. Accordingly, Vaughan fails to describe or suggest the method of claim 20.

Claim 21 depends from independent claim 20. When the recitations of this claim are considered in combination with the recitations of claim 20, Applicants submit that this dependent claim is likewise patentable over Vaughan for at least the same reasons set forth above.

Thus, for at least the reasons set forth above, Applicants respectfully request that the 35 U.S.C. § 102(b) rejection of claims 12-21 be withdrawn.

In view of the foregoing amendments and remarks, it is respectfully submitted that the prior art fails to teach or suggest the claimed invention and all of the pending claims in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited. Should anything remain in order to place the present application in condition for allowance, the Examiner is kindly invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,



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